

<i>Nycticorax nycticorax</i>	Blackcrowned Night Heron	SSC
<i>Pandion haliaetus</i>	Osprey	SSC
<i>Pelecanus occidentalis</i>	Brown Pelican	SSC
<i>Plegadis falcinellus</i>	Glossy Ibis	SSC
<i>Sterna antillarum</i>	Least Tern	T
<i>Vireo altiloquus</i>	Blackwhiskered Vireo	R

**FISHES**

<i>Centropomus undecimalis</i>	Common Snook	SSC
<i>Gobionellus stigmaturus</i>	Spottail Goby	SSC
<i>Oostethus lineatus</i>	Opossum Pipefish	R
<i>Rivulus marmoratus</i>	Rivulus	SSC

**STATUS DESIGNATION KEY:**

E=Endangered

T=Threatened

R=Rare

SSC=Species of Special Concern

The status of the above listed plant and animal species was determined by one or more of the following agencies and/or publications:

Florida Game and Freshwater Fish Commission; United States Fish and Wildlife Service; Florida Department of Agriculture; Rare and Endangered Biota of Florida (Pritchard Series).

## FISH COLLECTED IN LAKE WORTH LAGOON

TABLE 4

	FAMILY GENUS, SPECIES	COMMON NAME	MAP #	FAMILY GENUS, SPECIES	COMMON NAME
	BRANCHIOSTOMIDAE			BATRACHOIDIDAE	
	<i>Asymmetron</i> sp.	lancelet	34.	<i>Opsanus beta</i>	gulf toadfish
	<i>Asymmetron lucayanum</i>	sharptail lancelet			
	CARCHARHINIDAE		35.	ANTENNARIIDAE	
	<i>Carcharhinus limbatus</i>	blacktip shark	36.	<i>Antennarius ocellatus</i>	ocellated frogfish
			37.	<i>Histrio histrio</i>	sargassum fish
	RAJIDAE			<i>Arctomaris scaber</i>	splitfure frogfish
	<i>Raja cglaneria</i>	clearnose ray			
	DASYATIDAE		38.	OGCOCEPHALIDAE	
1.	<i>Dasyatis americana</i>	southern stingray	39.	<i>Ogcocephalus radianus</i>	polkadot batfish
5.	<i>Dasyatis sabina</i>	Atlantic stingray		<i>Ogcocephalus nasutus</i>	shortnose batfish
7.	<i>Dasyatis sayi</i>	bluntnose stingray			
8.	<i>Gymnura micura</i>	smooth butterfly ray	40.	HEMIRAMPHIDAE	
				<i>Hyporhamphus unifasciatus</i>	halfbeak
	ELOPIDAE		41.	BELONGIDAE	
9.	<i>Elops saurus</i>	ladyfish	42.	<i>Srangylura</i> sp.	needlefish
			43.	<i>Srangylura marina</i>	Atlantic needlefish
	MEGALOPIDAE		44.	<i>Srangylura notata</i>	redfin needlefish
10.	<i>Megalops atlanticus</i>	tarpon	45.	<i>Srangylura timuca</i>	timucu
				<i>Tylosurus acus</i>	agujon
	ALBULIDAE				
11.	<i>Albula vulpes</i>	bonefish	46.	CYPRINODONTIDAE	
			47.	<i>Floridichthys carpio</i>	goldspotted killifish
	OPHICHTHIDAE		48.	<i>Fundulus confluentus</i>	marsh killifish
12.	<i>Myrophis punctatus</i>	speckled worm eel		<i>Fundulus grandis</i>	gulf killifish
	CLUPEIDAE		49.	POECILIIDAE	
13.	undetermined sp.		50.	<i>Hacrandria formosa</i>	least killifish
14.	<i>Brevoortia smithi</i>	yellowfin menhaden		<i>Pocillia latipinna</i>	sailfin molly
15.	<i>Brevoortia tyrannus</i>	Atlantic menhaden			
16.	<i>Harengula</i> sp.	sardine	51.	ATHERINIDAE	
17.	<i>Harengula chupeola</i>	false pilchard	52.	<i>Membras marinica</i>	rough silverside
18.	<i>Harengula humeralis</i>	redear sardine		<i>Menidia beryllina</i>	tidewater silverside
19.	<i>Harengula jaguana</i>	scaled sardine			
20.	<i>Jenkinsia lamprotaenia</i>	dwarf herring	53.	FISTULARIIDAE	
21.	<i>Jenkinsia majua</i>	little-eye herring		<i>Fistularia tabacaria</i>	bluespotted cornetfish
22.	<i>Opisthonema oglinum</i>	Atlantic thread herring			
23.	<i>Sardinella aurita</i>	spanish sardine	54.	SYNGNATHIDAE	
			55.	<i>Hippocampus erectus</i>	lined seahorse
	ENGRAULIDAE		56.	<i>Hippocampus zosterae</i>	dwarf seahorse
24.	<i>Anchoa</i> sp.	anchovy	57.	<i>Syngnathus</i> sp.	pipefish
25.	<i>Anchoa mitchilli</i>	key anchovy	58.	<i>Syngnathus floridae</i>	duky pipefish
26.	<i>Anchoa hepsetus</i>	striped anchovy	59.	<i>Syngnathus louisianae</i>	chain pipefish
27.	<i>Anchoa hepsetus</i>	duky anchovy	60.	<i>Syngnathus pelagicus</i>	sargassum pipefish
28.	<i>Anchoa mitchilli</i>	bay anchovy		<i>Syngnathus scovelli</i>	gulf pipefish
	SYNODONTIDAE		61.	SCORPAENIDAE	
29.	<i>Synodus foetens</i>	inshore lizardfish	62.	<i>Scorpaena bergi</i>	goosehead scorpionfish
30.	<i>Trachinocephalus myops</i>	snakefish	63.	<i>Scorpaena calcarata</i>	smoothhead scorpionfish
				<i>Scorpaena grandicornis</i>	plumed scorpionfish
	CYPRINIDAE		64.	TRIGLIDAE	
31.	<i>Nothobranchius maculatus</i>	taillight shiner	65.	<i>Prionotus</i> sp.	scarabin
			66.	<i>Prionotus ophryas</i>	bandtail scarabin
32.	ARIIDAE		67.	<i>Prionotus sciaenoides</i>	leopard scarabin
33.	<i>Ariopsis felis</i>	sea catfish		<i>Prionotus tribulus</i>	highhead scarabin
	<i>Bagre marinus</i>	gastropail catfish			
			68.	CENTROPOMIDAE	
			69.	<i>Centropomus pectinatus</i>	tarpon snook
				<i>Centropomus undecimalis</i>	common snook

## FISH COLLECTED IN LAKE WORTH LAGOON

TABLE 4

FAMILY GENUS, SPECIES	COMMON NAME	MAP #	FAMILY GENUS, SPECIES	COMMON NAME
<b>SEMIANIDAE</b>			<b>SPARIDAE</b>	
<i>Diplectrum formosum</i>	sand perch	115.	<i>undetermined sp.</i>	sheepshead
		116.	<i>Archosargus probatocephalus</i>	sea bream
		117.	<i>Archosargus rhomboidalis</i>	porgy
<b>PRILACANTHIDOE</b>		118.	<i>Calamus sp.</i>	sheepshead porgy
<i>Pristigaster alia</i>	short bigeye	119.	<i>Calamus penna</i>	spottail pinfish
		120.	<i>Diplodus holbrooki</i>	pinfish
		121.	<i>Lagodon rhomboides</i>	
<b>APOGONIDOE</b>			<b>SCIAENIDAE</b>	
<i>Apogon pseudomaculatus</i>	twospot cardinalfish	122.	<i>undetermined sp.</i>	drum
<i>Phacops pigmentaria</i>	dusky cardinalfish	123.	<i>Bairdiella chrysoura</i>	silver perch
		124.	<i>Cynoscion arenarius</i>	sand seatrout
<b>POMATOMIDAE</b>		125.	<i>Cynoscion nebulosus</i>	spotted seatrout
<i>Pomatomus saltatrix</i>	bluefish	126.	<i>Leiostomus xanthurus</i>	spot
<b>CARANGIDAE</b>		127.	<i>Menidia americana</i>	southern kingfish
<i>undetermined sp.</i>	jack	128.	<i>Micropononius undulatus</i>	Atlantic croaker
<i>Caranx bartholomaei</i>	yellowjack	129.	<i>Odonotus denet</i>	reef croaker
<i>Caranx caysos</i>	blue runner	130.	<i>Pogonias cromis</i>	black drum
<i>Caranx hippos</i>	crevalle jack	131.	<i>Sciaenops ocellata</i>	red drum
<i>Caranx laevis</i>	horse-eye jack	132.	<i>Umbrina coroides</i>	sand drum
<i>Decapterus macarellus</i>	mackerel scad			
<i>Decapterus punctatus</i>	round scad		<b>EPHIPPIDAE</b>	
<i>Oligoplites saurus</i>	leatherjacket	133.	<i>Chaetodipterus faber</i>	Atlantic spadefish
<i>Selene vomer</i>	lookdown			
<i>Seriola sp.</i>	amberjack		<b>POMACANTHIDAE</b>	
<i>Trachinoas sp.</i>		134.	<i>Pomacanthus arcuatus</i>	gray angelfish
<i>Trachinoas carolinus</i>	Florida pompano			
<i>Trachinoas falcatus</i>	permit		<b>POMACENTRIDAE</b>	
<b>CYPHAENIDAE</b>		135.	<i>Abudefduf saxatilis</i>	sergeant major
<i>Coryphaena hippurus</i>	dolphin			
		136.	<i>Halichoeres maculipinna</i>	down wrasse
<b>LUTJANIDAE</b>		137.	<i>Hemipersonatus novacula</i>	pearly razorfish
<i>Lutjanus analis</i>	mutton snapper			
<i>Lutjanus apodus</i>	schoolmaster		<b>SCARIDAE</b>	
<i>Lutjanus griseus</i>	mangrove (gray) snapper	138.	<i>Cryptotomus roseus</i>	bluelip parrotfish
<i>Lutjanus synagris</i>	lane snapper	139.	<i>Sparisoma sp.</i>	parrotfish
<i>Rhomboplites aurorubens</i>	vermillion snapper	140.	<i>Sparisoma chrysopictum</i>	redtail parrotfish
		141.	<i>Sparisoma radians</i>	bucktooth parrotfish
<b>LOBOTIDAE</b>			<b>MUGILIDAE</b>	
<i>Lobotes surinamensis</i>	tripletail	142.	<i>Mugil sp.</i>	mullet
		143.	<i>Mugil cephalus</i>	striped mullet
<b>GERREIDAE</b>		144.	<i>Mugil curema</i>	white mullet
<i>Diaperus sp.</i>		145.	<i>Mugil gaimardianus</i>	red-eye mullet
<i>Diaperus auratus</i>	Irish pompano	146.	<i>Mugil trichodon</i>	fantail mullet
<i>Diaperus plumieri</i>	striped mojarra			
<i>Eucinostomus sp.</i>	mojarra		<b>SPHYRAENIDAE</b>	
<i>Eucinostomus argenteus</i>	spotfin mojarra	147.	<i>Sphyraena sp.</i>	
<i>Eucinostomus gula</i>	silver jenny	148.	<i>Sphyraena barracuda</i>	great barracuda
<i>Eucinostomus harengulus</i>	tidewater mojarra	149.	<i>Sphyraena borealis</i>	northern scannet
<i>Eucinostomus jonesii</i>	slender mojarra	150.	<i>Sphyraena picudilla</i>	southern scannet
<i>Eucinostomus melanopterus</i>	flagfin mojarra			
<i>Gereis cinereus</i>	yellowfin mojarra		<b>POLYNEMIDAE</b>	
<i>Gereis sp.</i>	mojarra	151.	<i>Polydactylus oligodon</i>	littlescale threadfin
<i>Ulaena lefroyi</i>	mottled mojarra			
<b>POMADASYIDAE</b>			<b>CLINIDAE</b>	
<i>Haemulon sp.</i>	grunt	152.	<i>Paralichthys fasciatus</i>	banded blenny
<i>Haemulon aurolineatum</i>	tomtate			
<i>Haemulon flavolineatum</i>	French grunt		<b>BLENNIIDAE</b>	
<i>Haemulon macrostomum</i>	spanish grunt	153.	<i>Lupinoblennius nicholsi</i>	highfin blenny
<i>Haemulon parrai</i>	sailors choice			
<i>Haemulon sciurus</i>	bluestriped grunt			
<i>Haemulon striatum</i>	striped grunt			

## FISH COLLECTED IN LAKE WORTH LAGOON

TABLE 4

MAP #	FAMILY GENUS, SPECIES	COMMON NAME
GOBIIDAE		
154.	<i>undetermined sp.</i>	goby
155.	<i>Bathygobius soporator</i>	trillfin goby
156.	<i>Coryphopterus glaucofraenum</i>	bridled goby
157.	<i>Gobionellus sp.</i>	goby
158.	<i>Gobionellus boleosoma</i>	darter goby
159.	<i>Gobionellus smaragdus</i>	emerald goby
160.	<i>Gobiosoma sp.</i>	goby
161.	<i>Gobiosoma boscii</i>	naked goby
162.	<i>Gobiosoma longipala</i>	two-scale goby
163.	<i>Gobiosoma gemmatum</i>	frecklefin goby
164.	<i>Gobiosoma robustum</i>	code goby
165.	<i>Lophogobius cyprinoides</i>	crested goby
166.	<i>Microgobius gulosus</i>	clown goby
167.	<i>Microgobius microlepis</i>	banner goby
NOMEIDAE		
168.	<i>Pomoxis cyanopterus</i>	freckled driftfish
BOTHIDAE		
169.	<i>Bochus sp.</i>	flounder
170.	<i>Bochus ocellatus</i>	eyed flounder
171.	<i>Citharichthys macrops</i>	spotted whiff
172.	<i>Citharichthys spilopterus</i>	bay whiff
173.	<i>Paralichthys albigutta</i>	gulf flounder
174.	<i>Syccium sp.</i>	flounder
175.	<i>Syccium micrurum</i>	channel flounder
176.	<i>Syccium papillosum</i>	dusky flounder
SOLEIDAE		
177.	<i>Achirus lineatus</i>	line sole
CYNOGLOSSIDAE		
178.	<i>Symphurus sp.</i>	tonguefish
179.	<i>Symphurus arawak</i>	caribbean tonguefish
180.	<i>Symphurus plagiosa</i>	blackchock tonguefish
BALISTIDAE		
181.	<i>Balistes sp.</i>	triggerfish
MONACANTHIDAE		
182.	<i>Abaetus scripus</i>	scrawled filefish
183.	<i>Monacanthus sp.</i>	filefish
184.	<i>Monacanthus ciliatus</i>	fringed filefish
185.	<i>Monacanthus hispidus</i>	planehead filefish
OSTRACIDAE		
186.	<i>Acanthostracion quadricornis</i>	scrawled cowfish
187.	<i>Lactophrys sp.</i>	trunkfish
188.	<i>Lactophrys rigorus</i>	trunkfish
189.	<i>Lactophrys triguet</i>	smooth trunkfish
TETRAODONTIDAE		
190.	<i>Sphoeroides sp.</i>	puffer
191.	<i>Sphoeroides nephelus</i>	southern puffer
192.	<i>Sphoeroides spengleri</i>	bandtail puffer
193.	<i>Sphoeroides tessellatus</i>	checkered puffer
DIODONTIDAE		
194.	<i>Chilomycterus schoepfi</i>	striped burrfish
195.	<i>Diodon hispidus</i>	porcupinefish

BIRD SPECIES OBSERVED AT JOHN D. MACARTHUR BEACH STATE PARK

Common Loon	<i>Gavia immer</i>
Pied-Billed Grebe	<i>Podilymbus podiceps</i>
Brown Pelican	<i>Pelecanus occidentalis carolinensis</i>
Double-Crested Cormorant	<i>Phalacrocorax auritus</i>
Water-Turkey	<i>Anhinga anhinga</i>
Man-O'-War Bird	<i>Fregata magnificens</i>
Great Blue Heron	<i>Ardea herodias</i>
Snowy Egret	<i>Egretta thula</i>
Reddish Egret	<i>Dichromanassa rufescens</i>
Louisiana Heron	<i>Hydranassa tricolor</i>
Little Blue Heron	<i>Florida coerula</i>
Green Heron	<i>Butorides striatus</i>
Black-Crowned Night Heron	<i>Nycticorax nycticorax</i>
Yellow-Crowned Night Heron	<i>Nyctanassa violacea</i>
American Bittern	<i>Botaurus lentiginosus</i>
Least Bittern	<i>Ixobrychus exilis</i>
Wood Stork	<i>Mycteria americana</i>
White Ibis	<i>Eudocimus albus</i>
Roseate Spoonbill	<i>Ajaia ajaja</i>
Lesser Scaup	<i>Aythya affinis</i>
White-Winged Scoter	<i>Melanitta deglandi</i>
Surf Scoter	<i>Melanitta perspicillata</i>
Red-Breasted Merganser	<i>Mergus serrator</i>
Turkey Vulture	<i>Cathartes aura</i>
Black Vulture	<i>Coragyps atratus</i>
Sharp-Shinned Hawk	<i>Accipiter striatus</i>
Cooper's Hawk	<i>Accipiter cooperii</i>
Red-Tailed Hawk	<i>Buteo jamaicensis</i>
Red-Shouldered Hawk	<i>Buteo lineatus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Osprey	<i>Pandion haliaetus carolinensis</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Merlin	<i>Falco columbarius</i>
Kestrel	<i>Falco sparverius</i>
Limpkin	<i>Aramus guarana</i>
Clapper Rail	<i>Rallus longirostris</i>
Virginia Rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
Coot	<i>Fulica americana</i>
American Oystercatcher	<i>Haematopus palliatus</i>
Semipalmated Plover	<i>Charadrius semipalmatus</i>
Wilson's Plover	<i>Charadrius wilsonia</i>
Killdeer	<i>Charadrius vociferus</i>
Black-Bellied Plover	<i>Pluvialis squatarola</i>
Ruddy Turnstone	<i>Arenaria interpres</i>
Spotted Sandpiper	<i>Actitis macularia</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Greater Yellowlegs	<i>Tringa melanoleuca</i>
Lesser Yellowlegs	<i>Tringa flavipes</i>
Least Sandpiper	<i>Calidris minutilla</i>
Dowitcher	<i>Limnodromus griseus</i>
Semipalmated Sandpiper	<i>Calidris pusillus</i>
Western Sandpiper	<i>Calidris mauri</i>
Sanderling	<i>Calidris alba</i>
Dunlin	<i>Calidris alpina</i>
Great Black-Billed Gull	<i>Larus marinus</i>
Ring-Billed Gull	<i>Larus delawarensis</i>
Laughing Gull	<i>Larus atricilla</i>
Bonaparte's Gull	<i>Larus philadelphia</i>
Forster's Tern	<i>Sterna forsteri</i>
Least Tern	<i>Sterna albifrons</i>
Royal Tern	<i>Sterna maxima</i>

BIRD SPECIES OBSERVED AT JOHN D. MACARTHUR BEACH STATE PARK - CONTINUED

Sandwich Tern	<i>Sterna sandvicensis</i>
Caspian Tern	<i>Sterna caspia</i>
Black Skimmer	<i>Rynchops niger</i>
Rock Dove	<i>Columba livia</i>
Mourning Dove	<i>Zenaida macroura</i>
Ground Dove	<i>Columbina passerina</i>
Yellow-Billed Cuckoo	<i>Coccyzus americanus</i>
Screech Owl	<i>Otus asio</i>
Great Horned Owl	<i>Bubo virginianus</i>
Chuck-Will's Widow	<i>Caprimulgus carolinensis</i>
Common Nighthawk	<i>Chordeiles minor</i>
Ruby-Throated Hummingbird	<i>Archiochus colubris</i>
Belted Kingfisher	<i>Megasceryle alcyon</i>
Flicker	<i>Colaptes auratus</i>
Pileated Woodpecker	<i>Dryocopus pileatus</i>
Red-Bellied Woodpecker	<i>Melanerpes carolinus</i>
Downy Woodpecker	<i>Picoides pubescens</i>
Eastern Kingbird	<i>Tyrannus tyrannus</i>
Great Crested Flycatcher	<i>Myiarchus crinitus</i>
Tree Swallow	<i>Iridoprocne bicolor</i>
Barn Swallow	<i>Hirundo rustica</i>
Purple Martin	<i>Progne subis</i>
Blue Jay	<i>Cyanocitta cristata</i>
Fish Crow	<i>Corvus ossifragus</i>
House Wren	<i>Troglodytes aedon</i>
Carolina Wren	<i>Thryothorus ludovicianus</i>
Mockingbird	<i>Mimus polyglottos</i>
Catbird	<i>Dumetella carolinensis</i>
Brown Thrasher	<i>Toxostoma rufum</i>
Robin	<i>Turdus migratorius</i>
Blue-Gray Gnatcatcher	<i>Polioptila coerulea</i>
Starling	<i>Sturnus vulgaris</i>
White-Eyed Vireo	<i>Vireo griseus</i>
Solitary Vireo	<i>Vireo solitarius</i>
Black-Whiskered Vireo	<i>Vireo altiloquus</i>
Red-Eyed Vireo	<i>Vireo olivaceus</i>
Black and White Warbler	<i>Mniotilta varia</i>
Parula Warbler	<i>Parula americana</i>
Cape May Warbler	<i>Dendroica tigrina</i>
Black-Throated Blue Warbler	<i>Dendroica caerulescens</i>
Yellow-Rumped Warbler	<i>Dendroica coronata</i>
Yellow-Throated Warbler	<i>Dendroica dominica</i>
Prairie Warbler	<i>Dendroica discolor</i>
Palm Warbler	<i>Dendroica palmarum</i>
Oven-Bird	<i>Seiurus aurocapillus</i>
Northern Waterthrush	<i>Seiurus noveboracensis</i>
Yellow-Throat	<i>Geothlypis trichas</i>
American Redstart	<i>Setophaga ruticilla</i>
Red-Wing Blackbird	<i>Agelaius phoeniceus</i>
Spotted Oriole	<i>Icterus pectoralis</i>
Boat-Tailed Grackle	<i>Quiscalus major</i>
Common Grackle	<i>Quiscalus quiscula</i>
Cardinal	<i>Cardinalis cardinalis</i>

\* Information From: Resource Inventory and Analysis of the John D. MacArthur Beach State Recreation Area (Duever, et al., 1981)

### **3.7 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE**

The proposed John's Island Environmental Restoration Project site is a former dredged disposal site with material stockpiled from the IWW dredging projects of the past. No harmful substances have been placed or are expected to exist on the site.

### **3.8 AIR QUALITY**

The existing air quality of the project site vicinity is typical of an urban area near the beach influenced by southerly trade winds. Overall air quality within the project area is good on most days with poor air quality the exception.

### **3.9 NOISE**

Airplane traffic overhead of the project area is the most noticeable sound within the project area. The area sustains some localized vehicular traffic and boat noise but not to any significant degree or amount.

### **3.10 AESTHETIC RESOURCES**

The proposed environmental restoration project area aesthetics are typical of a south Florida urban area with water frontage. In general aesthetics in the project area are good as development is to human scale and well maintained with fairly lush landscapes present in many viewsheds. Foreground project views reveal mostly residential development while panoramic views are of green horizons with water as far as the eye can see.

### **3.11 RECREATION RESOURCES**

The main recreation activity within the project area is boating. Other secondary recreational activities include fishing, water-skiing, sunbathing, birdwatching and sightseeing. Golf is played nearby at the Lake Worth Municipal Golf Course. John's Island does not promote swimming, but swimming may occur at the island during certain times of the year.

### **3.12 NAVIGATION**

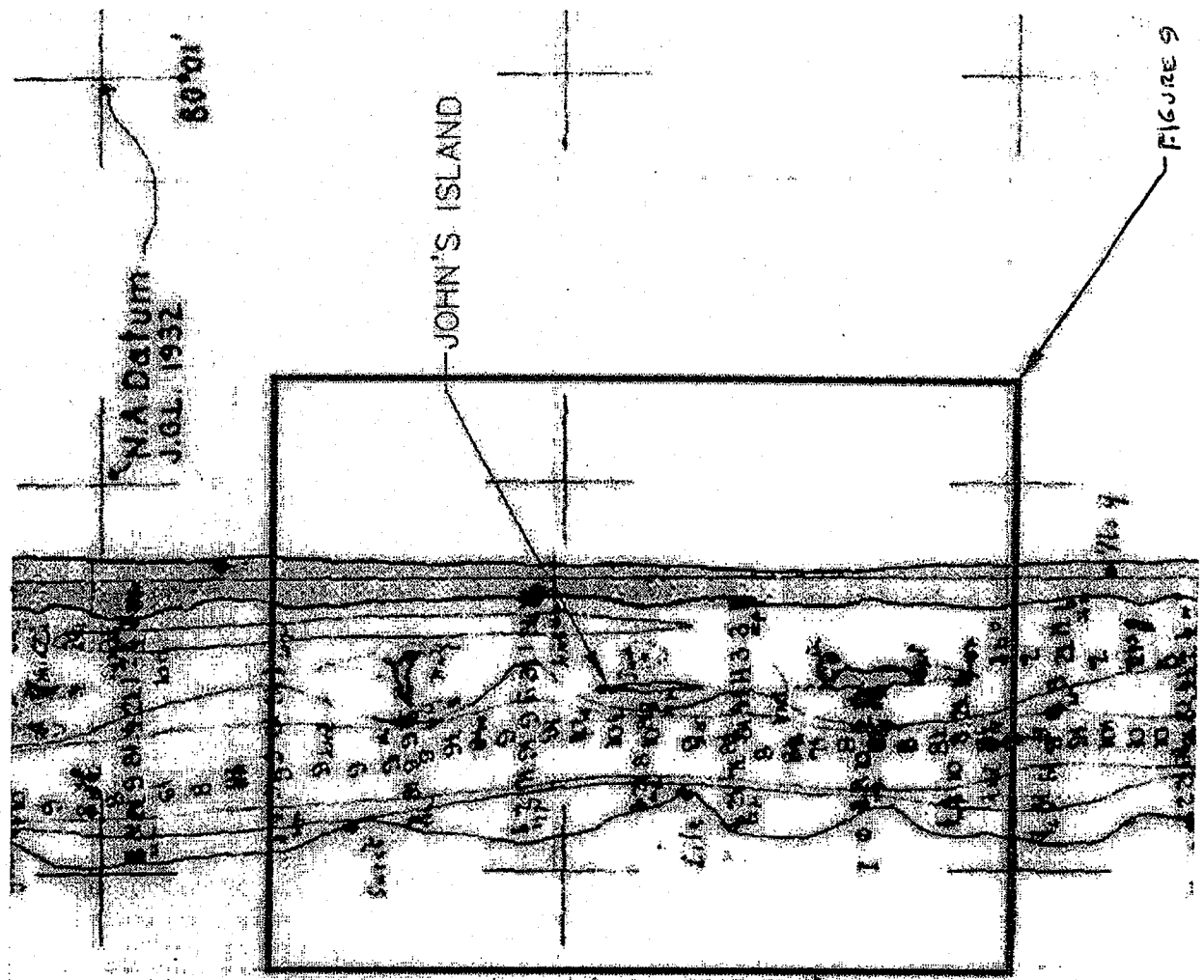
The Atlantic Intracoastal Waterway (IWW) is directly adjacent to the west of John's Island. The IWW is a Federally maintained navigation channel. It is authorized by the 1945 Rivers and Harbors Act and is 10 feet deep by 125 feet wide from Fort Pierce to Miami. In 1997, commodities transported by commercial barges was estimated at 424,00 tons (USACE, 1998).

### **3.13 HISTORIC PROPERTIES**

Historic research indicates that John's Island was created in the 1880's from dredge material from the construction of the Intracoastal Waterway by the Florida Coast Line Canal and Transportation Company. Additional dredged material was deposited on the island in the 1930's and 1940's during the creation of the Lake Worth Inlet and maintenance dredging of the Intracoastal Waterway. No historic properties are associated with the island.

### **3.14 HARDGROUNDS**

There are no mapped hardgrounds within the project area of John's Island 1135 Environmental Restoration Project. If the preferred disposal alternative (anoxic hole adjacent to the City of Lake Worth Municipal Golf Course) is not used, hardground investigations may be necessary for other disposal alternatives.



U.S. COAST AND GEODETIC SURVEY

J. H. HIGGINS, CHIEF

LAKE WORTH

FLORIDA

By the party under the charge of D. A. C. Morris, Assistant

in Charge, Station

1884

Scale 1:1000



Approved for printing  
J. H. HIGGINS  
J. H. HIGGINS



Rep No. 1604-B

NOT TO SCALE

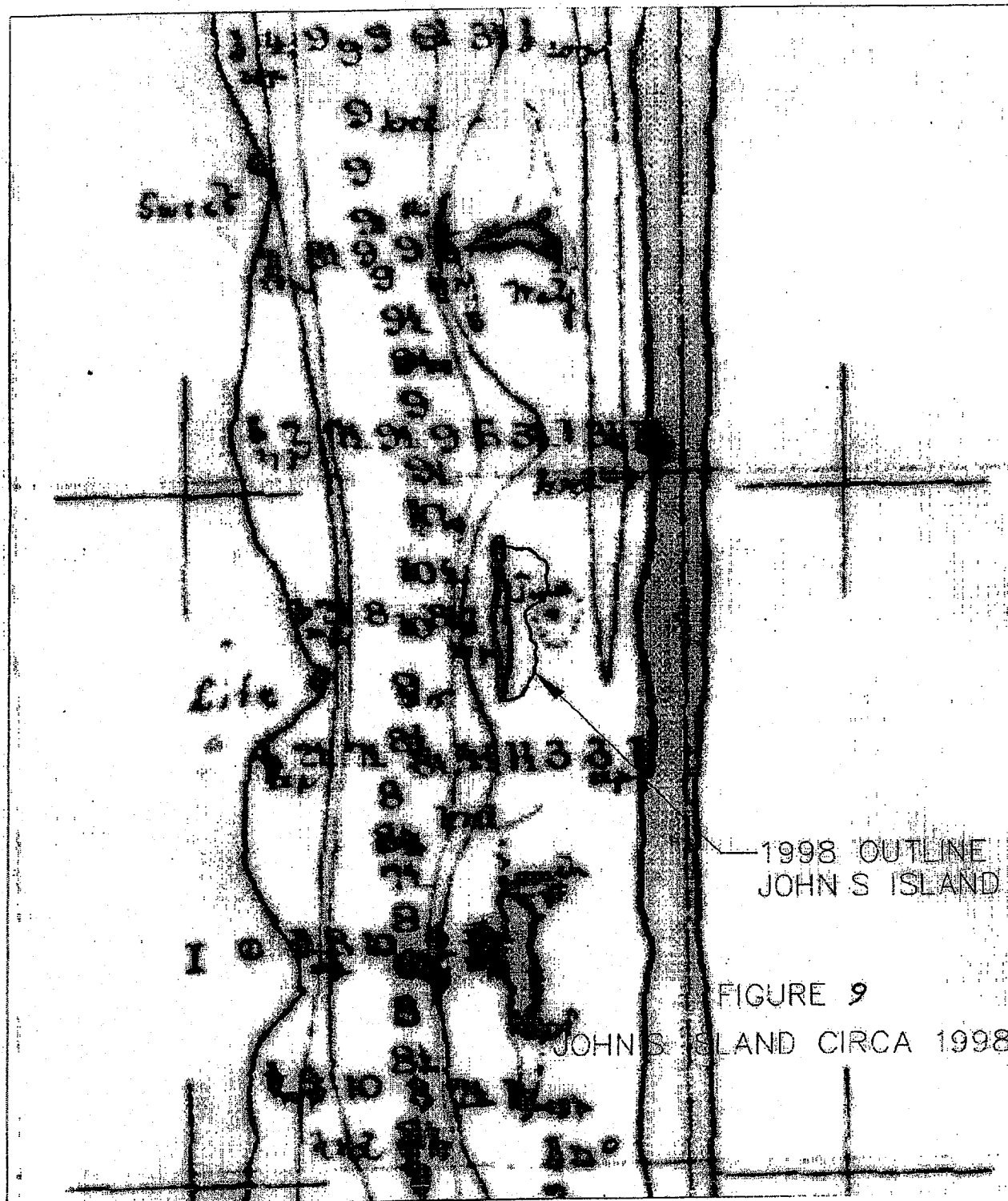
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PALM BEACH COUNTY  
DEPARTMENT OF  
ENVIRONMENTAL  
RESOURCES  
MANAGEMENT

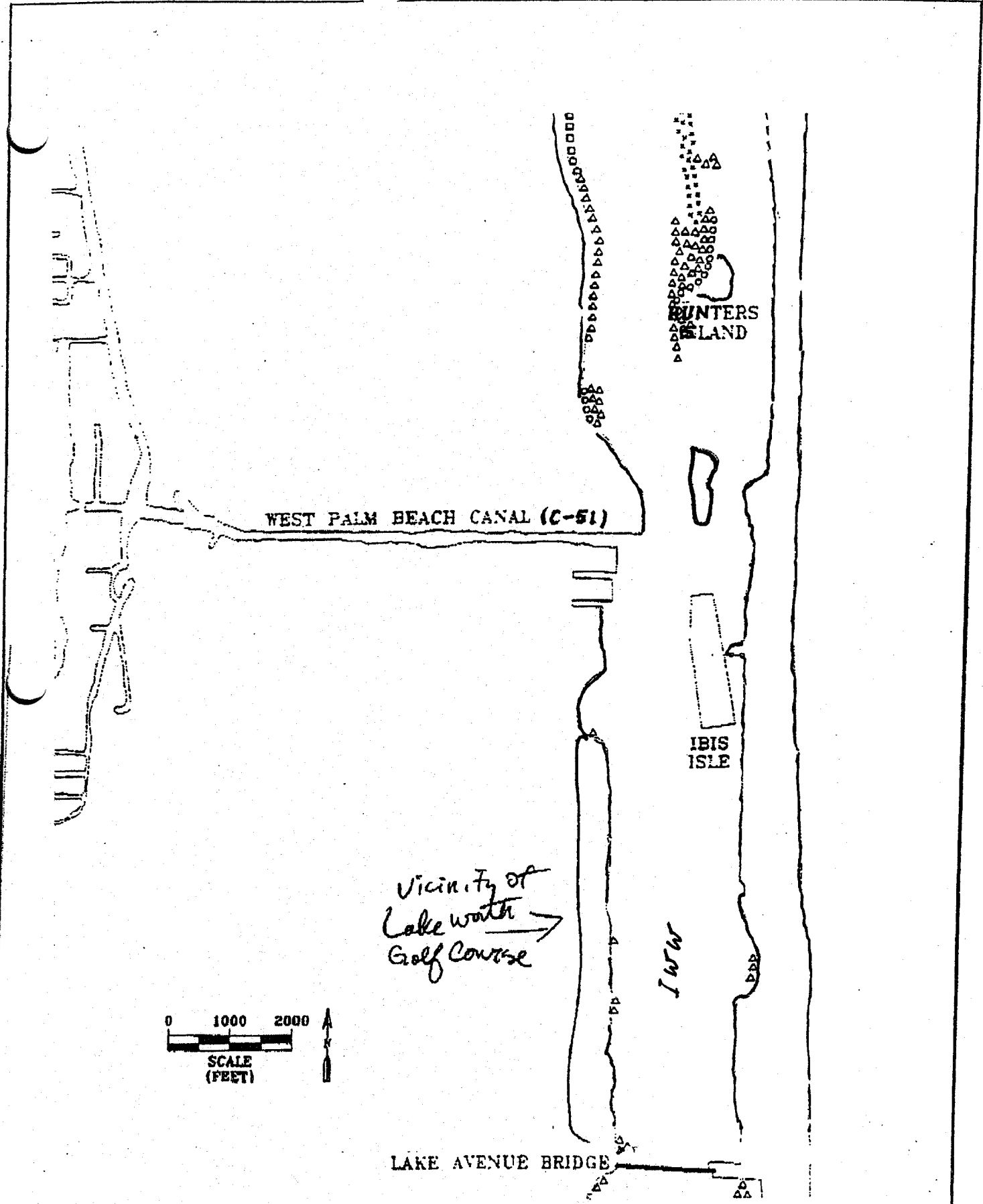
JOHNS ISLAND SECTION 1135  
ENVIRONMENTAL RESTORATION  
PALM BEACH COUNTY, FLORIDA





## LEGEND

-  *Halodule wrightii* SHOAL GRASS
-  *Halophila decipiens* PADDLE GRASS  
*Halophila johnsonii* JOHNSON'S SEAGRASS
-  MIXED *Halodule wrightii* AND *Halophila* SPECIES
-  *Syringodium filiforme* MANATEE GRASS
-  *Thalassia testudinum* TURTLE GRASS
-  ATTACHED MACRO - ALGAL SPECIES - INCLUDES: *Caulerpa* SPECIES  
(*C. sertularioides*, *C. prolifera*, *C. mexicana*), *Udotea* sp., *Penicillus* sp.,  
*Halimeda* sp., *Dictyota* sp., *Padina* sp., *Hypnea* sp., *Acanthophora spicifera*
-  MIXED *Halodule wrightii* AND ATTACHED MACRO - ALGAL SPECIES
-  MIXED *Halophila* SPECIES AND ATTACHED MACRO - ALGAL SPECIES
-  MIXED *Halodule wrightii*, *Halophila* SPECIES AND ATTACHED MACRO -  
ALGAL SPECIES
-  *Crossostrea* SPECIES (*C. virginica*, *C. rhizophorea*) OYSTER BAR
-  CORALS (*Siderastrea* sp., *Porites* sp., *Monastrea* sp., *Oculina* sp.,  
unidentified sp. SEA WHIP), AND SPONGES (*Cleona* sp. BORING SPONGE,  
*Spherospongia vesparium* LOGGERHEAD SPONGE)
-  DREDGED AREAS
-  FILLED AREAS



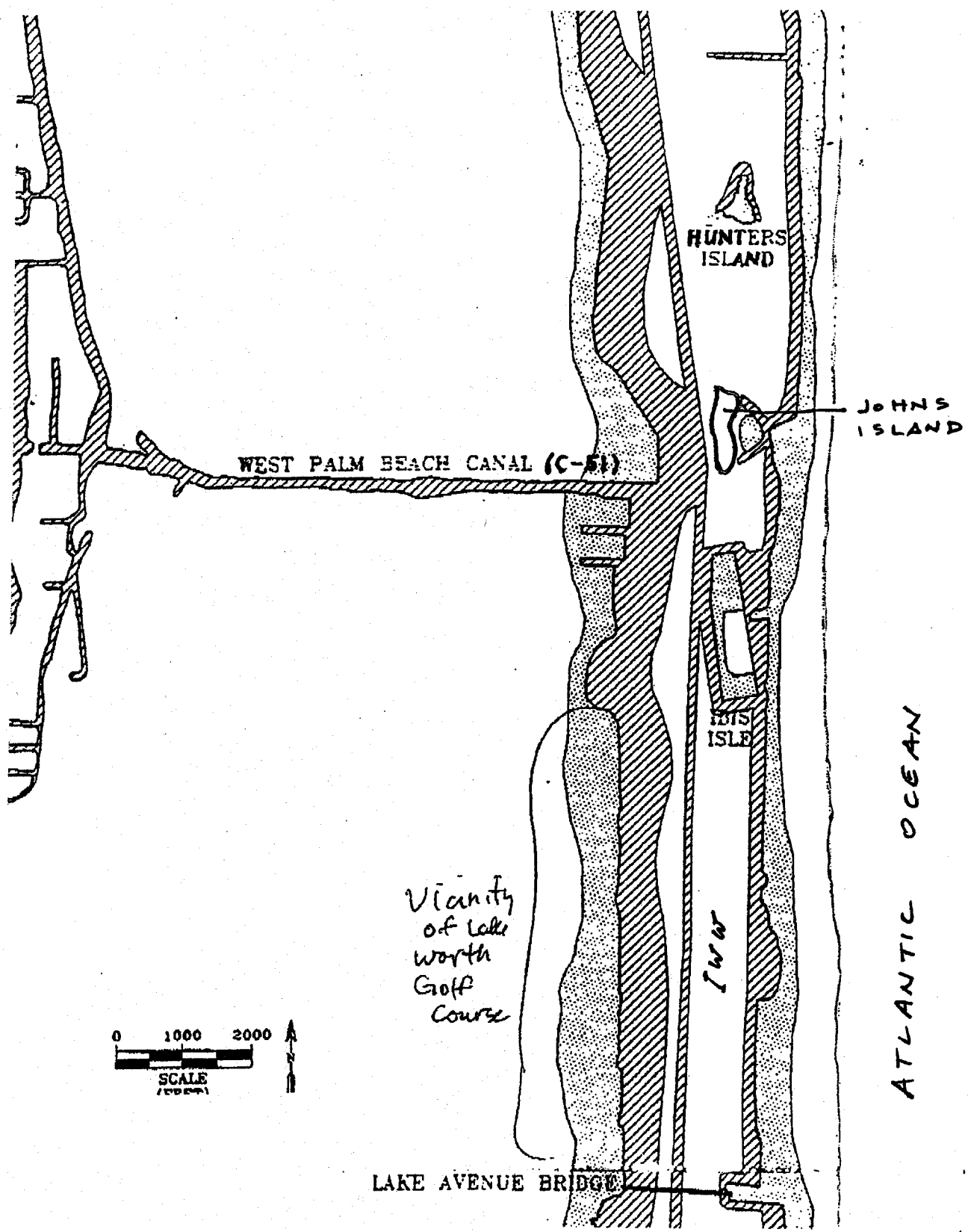
PER TO FIGURE 10.

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JOHNS ISLAND SECTION 1135  
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PALM BEACH COUNTY, FLORIDA



REFER TO FIGURE 10.

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JOHNS ISLAND SECTION 1135  
ENVIRONMENTAL RESTORATION  
PALM BEACH COUNTY, FLORIDA

TABLE 6

**JOHN'S ISLAND  
PROPOSED NATIVE PLANT SPECIES  
RESTORATION LIST**

**MARITIME HAMMOCK**

<b>Common Name</b>	<b>Genus species</b>	<b>Quantity</b>	<b>Container Size/ Height</b>
Torchwood	( <i>Amyris elemifera</i> )	11	3G/3-0'
Sea Grape	( <i>Coccoloba uvifera</i> )	46	3G/2-0'
Jamaica Caper	( <i>Capparis cynophallophora</i> )	11	3G/2-0'
Snowberry	( <i>Chicocca alba</i> )	16	3G/1'-6"
Fiddlewood	( <i>Citharexylum fruticosum</i> )	16	3G/3-0'
Gumbo Limbo	( <i>Bursera simaruba</i> )	27	15G/8-0'
Satinleaf	( <i>Chrysophy. oliviforme</i> )	11	7G/5-0'
Pigeon Plum	( <i>Coccoloba diversifolia</i> )	23	15G/8-0'
Green Buttonwood	( <i>Concarpus ere.</i> )	92	3G/3-0'
Strangler Fig	( <i>Ficus aurea</i> )	11	7G/5-0'
Mastic	( <i>Mastichodendron foetidissimum</i> )	11	3G/3-0'
Lancewood	( <i>Nectandra coriacea</i> )	11	10G/6-0'
Blackbead	( <i>Pithecellobium guadalupense</i> )	11	3G/2-0'
Paradise Tree	( <i>Simarouba glauca</i> )	11	15G/7-0'
Florida Privet	( <i>Forestiera segregata</i> )	16	3G/2'-6"
West Indigo Berry	( <i>Randia aculeata</i> )	27	3G/3-0'
Marlberry	( <i>Ardisia escallonioides</i> )	27	3G/2'-6"
Black Ironwood	( <i>Krugiodendron ferreum</i> )	11	7G/5-0'
Blolly	( <i>Guapira dicolor</i> )	16	3G/3-0'
Spanish Stopper	( <i>Eugenia foetida</i> )	16	3G/3-0'
White Stopper	( <i>Eugenia axillaris</i> )	16	3G/3-0'
Wild Lime	( <i>Zanthoxylum fagara</i> )	16	3G/3-0'
Myrsine	( <i>Myrsine guianensis</i> )	27	1G/3-0'

**TOTAL:** 480 Trees & Shrubs

**WETLAND PLANT SPECIES**

Red Mangrove	( <i>Rhizophora mangle</i> )	13,800	1G/1'-6"
Smooth Cordgrass	( <i>Spartina alterniflora</i> )	11,400	plugs

**TOTAL:** 25,200 Wetland Plants

## **4.0 ENVIRONMENTAL AFFECTS**

This section describes how the implementation of each alternative would affect the environmental resources listed in Section 1. A summary of these impacts can be found in Table 1 of Section 2.0. The following includes anticipated changes to the existing environment including direct, indirect and cumulative effects.

### **4.1 GENERAL ENVIRONMENTAL EFFECTS**

Impacts caused by the proposed restoration should be minor in nature with the implementation of appropriate protective measures. The restoration effort should enhance existing resources, such as habitat for listed species.

### **4.2 VEGETATION**

#### **4.2.1 PROPOSED ACTION, ENVIRONMENTAL RESTORATION WITH ANOXIC HOLE DISPOSAL.**

The proposed environmental restoration project would initially remove 5 acres of exotic vegetation from the upland and chip it for mulch to be used on the island. The cleared areas would be used for the restoration of tidal flow to existing mangroves, creation of wetland habitat and creation of maritime hammock habitat. Some uplands would be excavated to complete this work. Disposal of the excavated upland material into the anoxic hole adjacent to the City of Lake Worth Municipal Golf Course could adversely affect nearby seagrasses. Therefore appropriate measures such as the installation of silt curtains between the seagrass beds and the construction areas as well as keeping work vessels out of these areas would be implemented. A fifty foot long pier is proposed to extend from the island's west side so barges may tie up to the structure for excavated material loading. The pier will be removed upon project completion.

#### **4.2.2 OTHER DISPOSAL SITES**

Transporting the dredged material to other disposal sites would result in greater travel distances at greater expense. The presence of listed species of plants would be taken into consideration during the selection of another site.

#### **4.2.3 NO ACTION ALTERNATIVE (STATUS QUO)**

The no action alternative would not adversely affect protected species, such as Johnson's seagrass. However, this alternative would allow exotic vegetation and the exotic vegetation seed source to remain.

#### **4.2.4 EXOTIC VEGETATION REMOVAL METHODS**

Due to the presence of some native terrestrial vegetation, exotic plant removal will consist of three methodologies to be employed depending upon the area to be cleared. The three methods consist of: 1.) Clearing with Heavy Equipment, 2.) Selective Clearing of exotic vegetation by cutting or pulling individual trees from the protected area. If it is necessary to cut an exotic tree and leave the stump, the stump shall be treated with herbicide to preclude regrowth, 3.) "Hack and Squirt" which is the application of herbicides to individual trees, which are left in place with no disturbance of soils or surrounding vegetation. A combination of these exotic tree removal methods could be utilized where cost effective.

### **4.3 THREATENED AND ENDANGERED SPECIES**

#### **4.3.1 PROPOSED ACTION, ENVIRONMENTAL RESTORATION WITH ANOXIC HOLE DISPOSAL**

The proposed environmental restoration project is to be completed almost entirely on the 6.4-acre upland called John's Island. The removal of approximately 5 acres of exotic vegetation should not adversely affect protected species in the project vicinity. As stated above, the placement of excavated upland material into a nearby anoxic hole adjacent to the City of Lake Worth Municipal Golf Course shoreline may adversely affect Johnson's seagrass. Therefore, the previously described protective measures would be implemented. The standard construction precautions will be implemented to avoid adverse affects to manatees within the construction area. Reasonable and prudent measures will be implemented to avoid adverse affects to other protected species within the project area.

#### **4.3.2 OTHER DISPOSAL SITES**

The use, expansion or designation of other disposal alternatives could impact wetlands, open water or

other uplands. Beach disposal in Palm Beach County could impact valuable fish and wildlife resources, reef, hardgrounds, sea grass or other marine resources. Ocean disposal sites are typically selected and designated for areas where significant fish and wildlife resources would not be impacted. The environmental restoration proposal would remain the same as in the above alternative.

#### **4.3.3 NO ACTION ALTERNATIVE (STATUS QUO)**

Protected species could be adversely impacted if the proposed restoration project was not performed. The enhancement of existing habitat on John's Island should benefit protected species. Also, this alternative would allow exotic vegetation and the exotic vegetation seed source to remain.

### **4.4 FISH AND WILDLIFE RESOURCES**

#### **4.4.1 PROPOSED ACTION, ENVIRONMENTAL RESTORATION WITH ANOXIC HOLE DISPOSAL**

Fish and wildlife resources within the proposed environmental restoration upland are limited at best. Some migratory birds may loaf, nest or feed (very low possibility) within the island and would be subject to the Jacksonville District's Migratory Bird Protection Policy.

#### **4.4.2 OTHER DISPOSAL SITES**

The use, expansion or designation of other disposal alternatives could impact wetlands, marsh, open water or other uplands suitable for environmental resources. Beach disposal in Palm Beach County could impact valuable fish and wildlife resources, reef, hardgrounds, sea grass or other marine resources. Ocean disposal sites are typically selected and designated for areas where significant fish and wildlife resources would not be impacted. The environmental restoration proposal would remain the same as in the above alternative.

#### **4.4.3 NO ACTION ALTERNATIVE (STATUS QUO)**

Fish and wildlife resources could be adversely impacted if the proposed restoration project was not performed. The enhancement of existing habitat on John's Island should benefit wildlife and fish communities. Also, this alternative would allow exotic vegetation and the exotic vegetation seed source to remain.

### **4.5 HISTORIC PROPERTIES**

Since Johns Island is man-made there are no historic properties to be effected by the restoration project. Consultation with the State Historic Preservation Officer (December 2000) concurred with a finding of "no historic properties affected".

### **4.6 SOCIO-ECONOMIC**

The proposed John's Island environmental restoration project is considered a relatively simple and cost effective means of removing exotic vegetation, restoring and creating more historical native habitats of higher wildlife value. The nearby anoxic hole proposed for the excavated material disposal would be the most cost effective and environmentally friendly disposal option. This disposal option would help to restore benthic elevations in the area to more historical elevations also.

### **4.7 NAVIGATION**

The proposed action would not adversely effect the navigation in the adjacent IWW. Most of the proposed environmental restoration project would be constructed on the island's uplands. Tidal inlets and channels would be excavated from the eastern side of the island. Barges to transport the excavated material would be berthed in deep waters adjacent to the IWW for ready access to the channel and to avoid any seagrass where they may occur. Disposal of the excavated material will be accomplished in a manner that will avoid or minimize adverse affects to the environment and navigation within the project area.

### **4.8 AESTHETIC RESOURCES**

#### **4.8.1 PROPOSED ACTION, ENVIRONMENTAL RESTORATION WITH ANOXIC HOLE DISPOSAL**

The proposed construction of the environmental restoration project is not anticipated to adversely affect the aesthetic resources within the project area. Existing views from the surrounding areas will not be significantly altered nor adversely affected by the proposed project. Some temporary interruption of

aesthetic resources within the project viewshed can be expected during project construction but are anticipated to return to pre-construction conditions shortly after construction completion. The disposal of the excavated material in the nearby anoxic hole could temporarily affect views from the golf course to the Lake Worth Lagoon but will return to pre-construction conditions upon construction completion.

#### **4.8.2 OTHER DISPOSAL SITES**

The use of other disposal sites within the project area could produce a more significant affect to aesthetic resources. The need for additional equipment for longer periods of time, to travel greater distances would all factor into the aesthetic resources impacts.

#### **4.8.3 NO ACTION ALTERNATIVE (STATUS QUO)**

No federal participation in the proposed environmental restoration project would most likely mean no project would be constructed. If no project was constructed the exotic vegetation would remain on John's Island and could eventually degrade the aesthetic resources of the project area and surrounding area.

### **4.9 RECREATION**

The proposed environmental restoration project will not adversely affect recreation resources within the project area. Some minor temporary interruption of recreation activities may occur during project construction but should return to pre-construction conditions after construction has been completed. Some recreation resources may improve with the completion of the constructed environmental restoration project. The use of other disposal sites may adversely affect recreation resources over a broader area for a longer period of time.

### **4.10 COASTAL BARRIER RESOURCES**

John's Island is not within a designated coastal barrier resource unit. The proposed environmental restoration project and disposal of excavated material into the nearby anoxic hole would not adversely affect a coastal barrier resource unit. Placement of excavated material in other disposal areas may be subject to the act (see excerpts on the Coastal Barrier Resources Act in Appendix B – Coastal Zone Management Consistency Statement).

### **4.11 WATER QUALITY**

The proposed John's Island Environmental Restoration Project should not significantly affect water quality within the project area. The environmental restoration work is planned to occur on the island's uplands. The excavated material removed from John's Island will be placed in one of several locations. If the preferred disposal alternative is implemented, excavated material will be placed in the nearby anoxic hole, adjacent to the Lake Worth Municipal Golf Course. All State of Florida Water Quality Certificate conditions will be met during the environmental restoration project construction. Protective measures such as the installation of silt screens would be implemented.

### **4.12 SOLID WASTE**

It is not anticipated that any solid waste management issues will arise for the environmental restoration project on John's Island. Designation of other disposal sites as an alternative, may involve management of any solid waste found on the site. Ocean disposal or beach placement would not likely involve solid waste issues. In November, 1997, the Palm Beach County Department of Environmental Resources Management completed a Phase I Environmental Site Assessment (ESA) on John's Island. Minor amounts of nonhazardous litter were found. Based on prior reported land uses of the island, it is not likely that buried debris or materials will be found on the site. The island was examined for "Recognized Environmental Conditions" in accordance with American Society of Testing and Materials (ASTM) Standard 1527-94. This assessment revealed no evidence of recognized hazardous environmental conditions in connection with the John's Island Environmental Restoration Project.

### **4.13 HAZARDOUS, TOXIC AND RADIOACTIVE WASTE**

The Hazardous, Toxic or Radioactive Waste (HTRW) assessment was conducted June 2, 2000, for this project in accordance with the requirements of ER-1165-2-123, HTRW Guidance For Civil Works Projects. The assessment indicated that in general, no evidence of HTRW exists. The HTRW database review indicated that no contamination exists on John's Island or the dredged material disposal area. The



preliminary assessment indicated that no hazardous, toxic, radioactive (HTRW), or other harmful substances are impacting the project area. If contaminants are found during project construction, the site must be remediated. During project construction HTRW awareness will be practiced.

#### **4.14 AIR QUALITY**

The proposed environmental restoration project will not adversely effect air quality within the project area. Some temporary increase in air pollution within the project vicinity can be expected during project construction. Once project construction has been completed daily air quality within the project area will return to pre-construction levels.

#### **4.15 NOISE**

The proposed environmental restoration project will not adversely effect sound levels in the project vicinity. Some temporary noise level increases can be expected during construction activities. Once the restoration project construction has been completed daily noise levels within the project area will return to pre-construction conditions.

#### **4.16 PUBLIC SAFETY**

We do not anticipate any notable public safety issues associated with the proposed environmental restoration project on John's Island. The disposal of excavated material from the island should not pose a threat to the public safety.

#### **4.17 ENERGY REQUIREMENTS AND CONSERVATION**

Construction of the environmental restoration project on John's Island and the disposal of excavated material in the nearby anoxic hole would be as or more energy efficient than use of other disposal alternatives (other than the 'no action'). Beach, ocean and most other disposal options would require more energy and greater time to implement.

#### **4.18 NATURAL OR DEPLETABLE RESOURCES**

The proposed action would not deplete natural resources within the project area. The environmental restoration plans propose to restore degraded habitat to more native, historic and productive habitats.

#### **4.19 SCIENTIFIC RESOURCES**

We would not expect any notable adverse affects to scientific resources by the proposed action or alternatives.

#### **4.20 NATIVE AMERICANS**

We do not expect any impacts to Native Americans by the proposed action or alternatives.

#### **4.21 CUMULATIVE IMPACTS**

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions (40 CFR 1508.7). Overall cumulative impacts of this project are projected to be beneficial without negative impacts. Restoration of existing mangroves, creation of inshore shallow water habitat and creation of mangroves will increase functioning mangrove and seagrass habitats in Lake Worth Lagoon. The creation of a maritime hammock will positively affect the existing area and increase roosting and nesting habitat for birdlife. Overall, the proposed Section 1135 environmental restoration project will increase habitat for fish, birds and other wildlife within the Lake Worth Lagoon area.

#### **4.22 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

##### **4.22.1 IRREVERSIBLE**

An irreversible commitment of resources is one in which the ability to use and/or enjoy the resource is lost forever. One example of an irreversible commitment might be the mining of a mineral resource. Once that mineral was removed it would be gone forever. We do not expect any irreversible commitment of resources for the proposed action (other than fuel and construction materials). Use of some other disposal location or ocean disposal may result in the use of additional fuel and or the loss of the sand resources.

#### **4.22.2 IRRETRIEVABLE**

An irretrievable commitment of resources is one in which, due to decisions to manage the resource for another purpose, opportunities to use or enjoy the resource as they presently exist are lost for a period of time. An example of irretrievable loss might be where a type of vegetation is lost due to road construction. We do not expect any notable irretrievable commitment of resources for the proposed action. Some minor or temporary loss of exotic vegetation cover will be experienced but will soon be replaced by established, native vegetation planted to restore the island to a more productive, historically native habitat. Disposal options other than the preferred alternative (anoxic hole adjacent to the City of Lake Worth Municipal Golf Course) could impact vegetation, wetlands, other waters or other resources.

#### **4.23 UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS**

Unavoidable adverse environmental impacts of the proposed action are relatively minor. Impacts from various alternatives may be greater than the selected alternative (see impacts discussed in the proposed sections).

#### **4.24 LOCAL SHORT-TERM USES AND MAINTENANCE/ENHANCEMENT OF LONG-TERM PRODUCTIVITY**

The proposed action would restore environmental habitats on John's Island to a more native and natural condition with higher wildlife value. Short-term uses of the island may include observations to detect wildlife usage or plant growth within the project limits. Project maintenance envisioned would include removal of exotic vegetation species if they were to reoccur within the restoration project area. Disposal of approximately 17,000 cubic yards of excavated material into the nearby anoxic hole would be the option least likely to adversely affect the environment. Ocean, beach and or upland disposal alternatives would most likely involve more environmental impacts and require a longer contract at greater cost.

#### **4.25 INDIRECT EFFECTS**

Completing the proposed project will assist in restoring John's Island to a more native and natural habitat. The proposed action will increase essential hammock, wetland and seagrass habitats that are being eliminated due to shoreline development (Harris, et, el., 1983). As a result, quantities of fishery and rookery habitat could be increased.

The proposed action would assist The Florida Department of Environmental Protection (FDEP) which has designated the Lake Worth Lagoon as an "Ecosystem Management Area". Ecosystem Management is FDEP's integrated approach to management of Florida's biological and physical environments--conducted through the use of tools such as planning, land acquisition, environmental education, regulation, economic incentives, and pollution prevention--designed to maintain, protect and improve the Florida's natural, managed and human ecosystems. This comprehensive strategy is to provide not only better environmental and public health protection, but also to protect entire systems. The Lake Worth Lagoon Ecosystem Management Mission Statement is as follows:

*"To restore, conserve and manage the Lake Worth Lagoon Ecosystem to a level of quality to obtain measurable and significant improvement to the Lagoon's water and sediment quality; and to provide habitat for native plants, fish and wildlife, and aesthetic, recreational and economic benefits for the residents and visitors of Palm Beach County; and to encourage, develop and promote a partnership of public and private interests to manage the Lagoon"*

#### **4.26 COMPATIBILITY WITH FEDERAL, STATE AND LOCAL OBJECTIVES**

John's Island Environmental Restoration Project corresponds with the auspices of the Palm Beach County's Comprehensive Management Plan and FDEP's Ecosystem Management Plan and numerous Palm Beach County objectives to restore and protect the lagoon. These objectives include recommendations for habitat restoration, which have been realized with the completion of the Munyon Island Environmental Restoration Project and the initiation of the Peanut Island Environmental Restoration Project and John's Island Environmental Restoration Project. The proposed John's Island Environmental Restoration project will not be contrary to Federal, State or local objectives and land use planning.

#### **4.27 CONTROVERSY**

There are no controversial aspects of the proposed Federal environmental restoration project. Some potential debate regarding essential fish habitat (seagrass) could be expressed.

#### **4.28 UNCERTAIN, UNIQUE, OR UNKNOWN RISKS**

No uncertain, unique or unknown risks have been identified nor are any anticipated with the construction of the proposed Federal project.

##### **4.28.1 GEOTECHNICAL**

A subsurface investigation within the project area of the John's Island Environmental Restoration project area was conducted by Palm Beach County (PBC), Department of Environmental Resources Management's (DERM) contractor, SEA Systems Corporation, on March 10, 1998.

##### **4.8.1a SAMPLING METHODS**

The subsurface investigation of the John's Island Restoration project area was performed in March 10 1998. A jet probe investigation which utilized a hydraulic water pump and 10 foot long steel tubing, sampled spots determined by PBC DERM. Discharges were noted for color, composition and other characteristics while probe depths, resistance and refusal were also noted.

##### **4.8.1b SEDIMENT COMPOSITION**

The results of the investigation determined the presence of compacted sand and shell with isolated rock at variable depths across the island. Consolidated material was encountered at depths of eight to ten feet (SEA, 1998). Probes were conducted in the proposed tidal channel, tropical hammock and mangrove creation locations. The discharges were composed of clean, sand, shell with some small rock in the 16 probes taken. These samples represent an area of native IWW sediments. Results of the sediment analyses determine the island contains materials suitable for disposal in the anoxic hole adjacent to the City of Lake Worth Municipal Golf Course.

##### **4.8.1c SUITABILITY OF MATERIAL**

Based on the samples taken on the island, the existing sediments are of suitable quality and do not appear to require any treatment prior to disposal within the Lake Worth Lagoon. The samples resemble beach sand and were deposited as dredged material from the Lake Worth Inlet and the Intracoastal Waterway dredging projects. The John's Island material is a good resource and provides a good opportunity to restore dredged areas within the Lake Worth Lagoon.

#### **4.29 PRECEDENT AND PRINCIPLE FOR FUTURE ACTIONS.**

The proposed environmental restoration project is not anticipated to set a negative precedence or principle for future actions.

#### **4.30 ENVIRONMENTAL COMMITMENTS.**

The U.S. Army Corps of Engineers and its contractors commit to avoiding, minimizing or mitigating for adverse effects during the project construction activities by including the following commitments in the contract specifications: (1) All water-based activities will follow Jacksonville District US Army Corps of Engineers Standard Manatee Protection Conditions; (2) All water turbidity requirements listed in the State of Florida Environmental Resource Permit/Water Quality Certificate will be implemented, (3) Invasive species management will be undertaken to reduce exotic species where possible and prevent their distribution in all instances, (4) All seagrass impacts will be avoided where possible, minimized or mitigated as appropriate under the direction of the National Marine Fisheries Service, (installation of silt curtains), (5) Prior to construction, the State must concur with the Coastal Zone Consistency Statement (Appendix B), (6) Prior to construction, the State Historic Preservation Officer must concur with the Jacksonville District's determination of 'no effect' on any eligible historic resources within the project work.